Mobile Sources

A Proposal for Modeling the Benefits of Renewable Fuels

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Traditional Mobile Source Modeling

- MOBILE
  - Tool for predicting air quality impacts (HC, CO & NOx) from highway vehicles
  - Used for SIPs, Conformity, Rulemaking, etc.
  - Covers gasoline & diesel, all emission standards
- New Generation Model (MOVES)
  - To include PM, Toxics, CO2
  - More flexible to accommodate new technologies and fuels

A Better Approach for Renewable Fuels

The full benefit of renewable fuels is not captured when mobile source modeling only addresses fuel combustion.

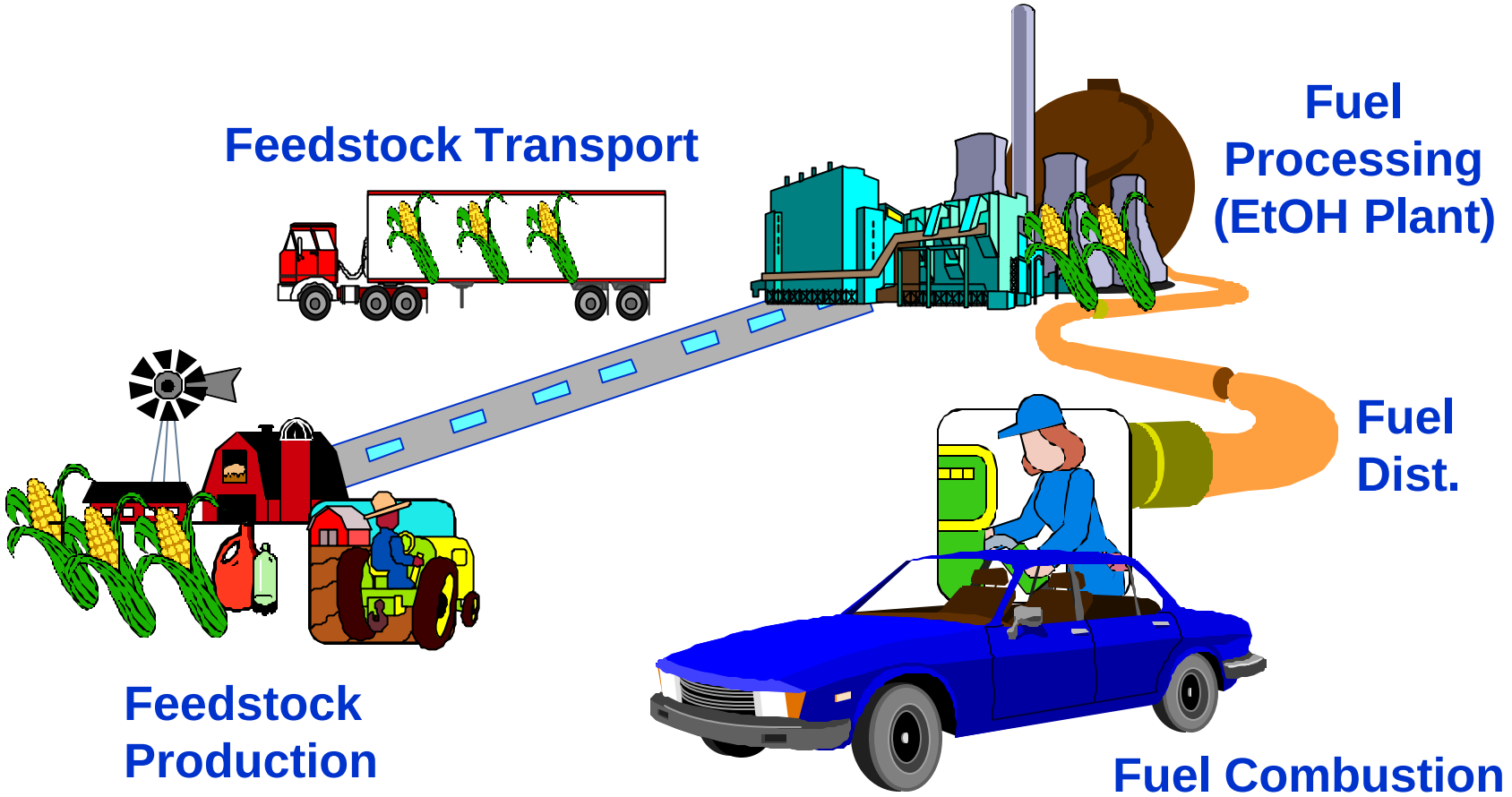
Therefore, to support the use of renewable fuels, mobile source modeling should be:

- Life Cycle based
- Fuel and Producer Specific
- Address multi-media impacts

What is lifecycle modeling?

- Spreadsheet-based computer model
- Accounts for all energy and emissions, throughout a production process
- For fuels, this includes:
  - fuel feedstock production
  - feedstock transport
  - fuel processing
  - fuel distribution to the retail outlet
  - fuel combustion, and disposal issues

Ethanol Production Process



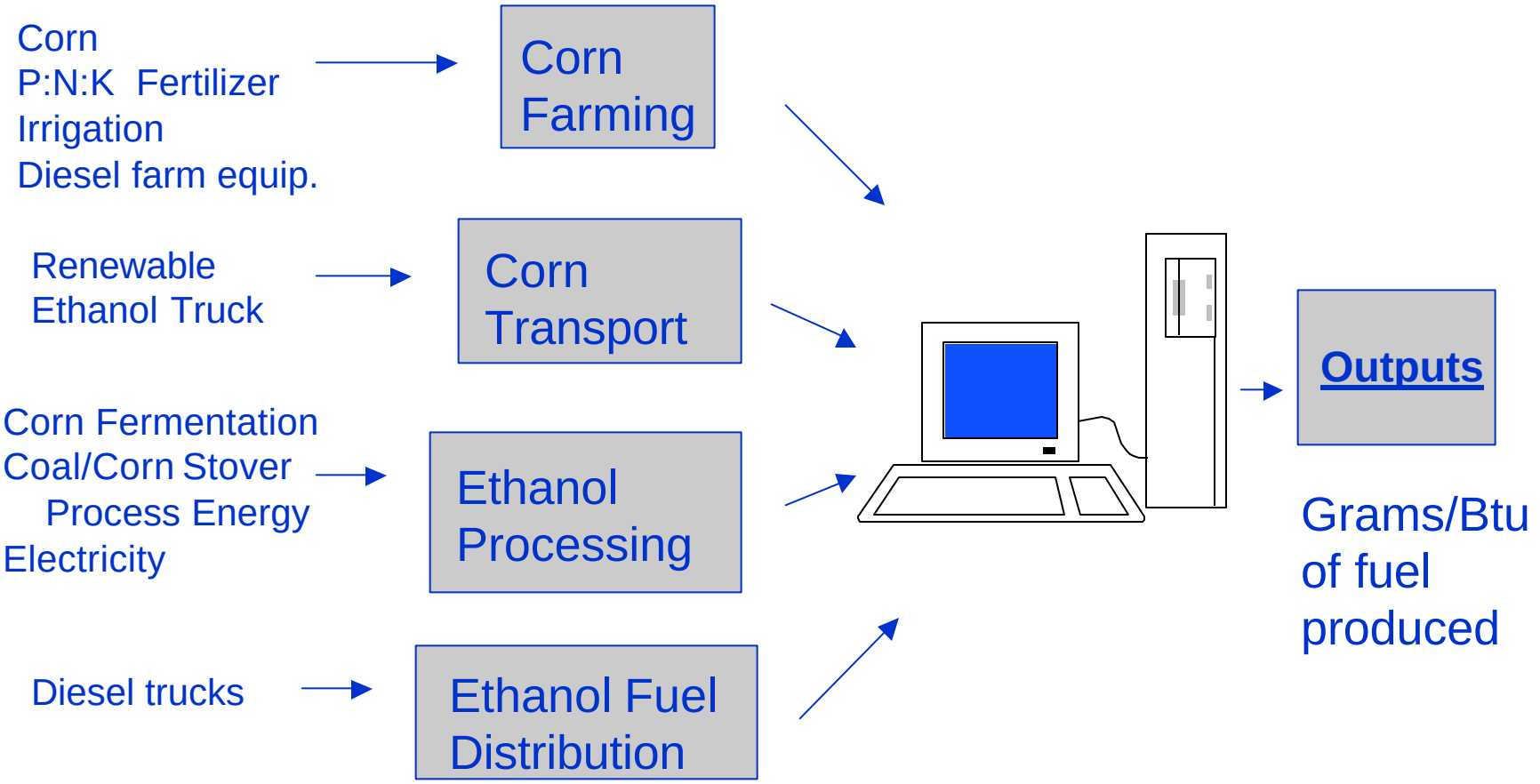
Lifecycle Modeling Goals

- Incorporate entire production process
  - “explicitly recognizes connections between all dimensions”
- Identify key processes, emission sources
- Allow equitable comparison between products (i.e. fuels)
- Suggest areas for improvement
- Flexible and user-friendly

How is Lifecycle Modeling Done?

- Data is gathered, or assumed, for each step in each process
- Equations are compiled to account for entire process for each product
- Tracks all materials in and out
- Accounts for emissions and energy
- Results depend on input data, variables, and assumptions

Lifecycle Modeling - EtOH example



Approaches to Lifecycle Modeling of Fuels

	Current
Users?	Policy analysts
Purpose?	Make general comparisons based on industry averages or assumptions of future
Suggest Improvement?	No
Model inputs?	industry-wide estimates
Model outputs?	industry-wide projections for fuel/feedstock combinations
Scope?	life-cycle including fuel combustion in vehicle

Approaches to Lifecycle Modeling of Fuels

	Current	**NEW**
Users?	*Policy analysts*	**fuel producers**
Purpose?	*Make general comparisons based on industry averages or assumptions of future*	**To track actual emissions of individual fuel plants**
Suggest Improvement?	*No*	**Yes**
Model inputs?	*industry-wide estimates*	**actual data for indiv plants**
Model outputs?	*industry-wide projections for fuel/feedstock combinations*	**plant-specific GHG emissions assoc with individual plants**
Scope?	*life-cycle including fuel combustion in vehicle*	**life-cycle excluding fuel combustion in vehicle**

Data Needs for Modeling Transportation Fuels

- Wide range of data needed, and sources
- Not always readily available
  - data not measured or recorded
  - confidentiality issues
- Vary somewhat, depending on approach
- Vary by fuel
- Vary by process step

Data Needs By Step:

- Feedstock production/extraction
  - most complicated step
  - not directly controlled by fuel producers
  - probably cannot rely totally on national defaults
- Feedstock Trans - national ave, or regional
- Fuel Processing - controlled by producer
- Fuel Distribution - minor, base on estimates

Modeling Issues for Transportation Fuels

- Complexity, level of detail
- Data sources
  - **determining best sources**
  - **how much to estimate**
  - **how to ensure accuracy**
- Handling of secondary fuels used
- Synergistic impact of upstream and downstream changes

Questions for Stakeholders

- What are the goals for lifecycle modeling of alternative fuels?
  - Air quality, ‘renewability’, efficiency, ...
- What are the best available data sources?
- How do we standardize methodology? ISO 14000
- How do we ensure accuracy?
  - Reporting, auditors, ...
- How can lifecycle modeling inform policy decisions?

Introducing EPA/OTAQ's Approach to Modeling Renewable Fuels

- Draft Model Developed "Fuel-CO2"
  - Can model any fuel
  - Focused on Fuel Producer
  - Currently tracks carbon and fossil energy use
- WORKSHOP July 10, 2002
  - To introduce the draft model
  - To gather comment and input on approach
  - To develop 'data partnerships' with fuel producers willing to test the draft model